Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions

Fiscal Year 1995

Detailed Statistical Tables

Division of Science Resources Studies
Directorate for Social, Behavioral, and Economic Sciences

National Science Foundation

NSF 97-330

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NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD
ARLINGTON, VA 22230

LETTER OF TRANSMITTAL

Dear Mr. President:

It is my honor to transmit to you the statistical report, *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: Fiscal Year* 1995, in accordance with the National Science Foundation Act of 1950, as amended.

Respectfully yours,

Neal Lane

Neal Lane
Director

The President
The White House
Washington, DC 20500

FOREWORD

Institutions of higher education, the major source of the Nation's scientists and engineers, perform about one-half of the Nation's basic research. Therefore, the level, distribution, and characteristics of Federal academic support are of much interest to officials at Federal, state, and local levels and in nongovernmental sectors.

The National Science Foundation Act of 1950, as amended, requires that the Foundation " . . . initiate and maintain a program for the determination of the total amount of money for scientific and engineering research, including money allocated for the construction of the facilities wherein such research is conducted, received by each educational institution and appropriate nonprofit organization in the United States, by grant, contract, or other arrangement from agencies of the Federal Government, and to report annually thereon to the President and the Congress."

To fulfill this requirement, the Foundation has utilized the data collection system originally designed by the Committee on Academic Science and Engineering of the Federal Council for Science and Technology. The Foundation annually collects statistical data from the 15 Federal agencies that account for virtually all support for science and engineering (S&E) research and development at educational institutions. Data are also collected on these agencies' obligations to nonprofit institutions.

Since its inception, this survey system has been the sole source of data on Federal funding to individual institutions for S&E activities and therefore attracts a wide audience. These data provide information that enables users to examine patterns of support for individual institutions over time and to compare such patterns with those of other institutions.

We are grateful for the continued cooperation of the responsible staff members in the participating agencies, and we appreciate their efforts to assist us in ensuring the quality of their data submissions.

Jeanne E. Griffith
Director
Division of Science Resources Studies
National Science Foundation

November 1997

ACKNOWLEDGMENTS

The preparation of *Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: Fiscal Year 1995,* was managed by Richard J. Bennof, Analyst, National Science Foundation (NSF), Division of Science Resources Studies (SRS), Research and Development Statistics Program (RDS), under the overall direction of John E. Jankowski, Jr., Program Director, RDS, with guidance and review provided by Jeanne E. Griffith, Division Director, SRS, and Alan R. Tupek, Deputy Division Director, SRS. Anne Houghton and Julia Harriston of the Publications Management Group of SRS provided copyediting, processing, and final composition for this report. The overview section of this report was reviewed by Alan Rapoport, SRS and Christine Matthews, Congressional Research Service. Quantum Research Corp. (QRC) of Bethesda, MD, under NSF contract number SRS 94-21044, prepared the tables and report copy. QRC staff members who worked on this project were Heidi L. Clark, Gail H. Henry, Keri R. Leibensperger, Hilary E. Jones, Elizabeth H. Peto, and Jennifer D. Ranwez.

CONTENTS

OVERVIEW

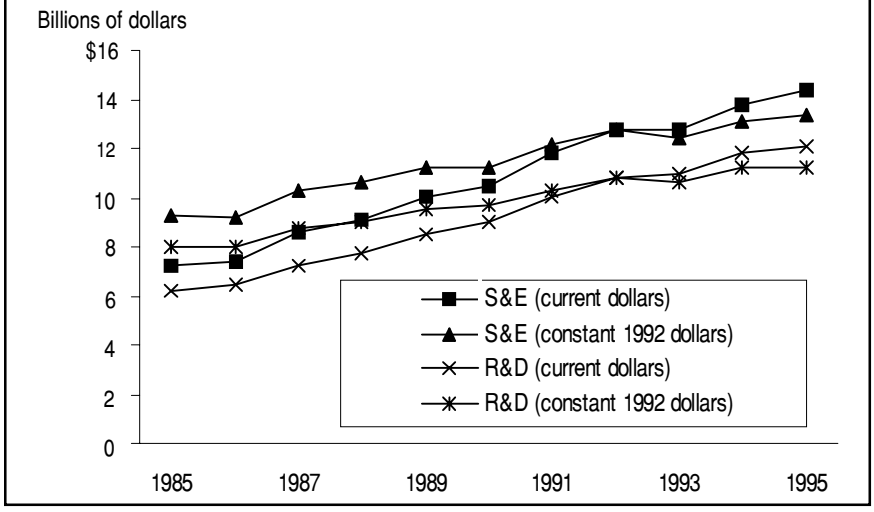
Federal agencies reported a 4-percent increase in fiscal year (FY) 1995 obligations for academic science and engineering (S&E) activities, to a record high of $14.3 billion. The increase follows the 8-percent growth between FYs 1993 and 1994 in total Federal S&E funding. Measured in constant 1992 dollars, Federal academic S&E obligations increased by nearly 6 percent in FY 1994 and nearly 2 percent in FY 1995.

CATEGORIES OF SUPPORT

The six academic funding categories in the Federal S&E Support Survey are: (1) research and development (R&D); (2) fellowships, traineeships, and training grants (FTTG); (3) R&D plant; (4) facilities and equipment for instruction; (5) general support for S&E; and (6) other S&E activities. R&D programs have maintained a consistent dominance of the academic S&E total in recent years (chart 1). Between FYs 1985 and 1995, the proportion provided R&D programs ranged from 84–87 percent of total academic S&E support. Academic R&D funds totaled $12.1 billion in FY 1995, an increase of more than 2 percent from the FY 1994 level (a small decrease, however, when the 2.5-percent inflation rate is taken into account). Agency specific data show that Department of Health and Human Services (HHS) projects accounted for more than one-half ($6.5 billion) of all academic R&D obligations.

Each of the other five academic S&E categories showed increased funding levels in FY 1995, and each, except for "other S&E activities," increased to new highs at rates exceeding inflation. The "other S&E activities" category (whose current-dollar record was $992 million in FY 1992) includes all academic S&E activities that cannot meaningfully be assigned to one of the other five categories. Obligations for this category increased by 2 percent in current dollars with the Department of Agriculture (USDA) supplying over two-fifths of the total in FY 1995. FTTG support, up 6 percent in current dollars, rose to $674 million in FY 1995; HHS accounted for the majority of the increase and more than three-fifths of the FTTG total. R&D plant funds grew 56 percent to $335 million, largely from National Science Foundation (NSF) projects funded in the agency's Major Research Equipment and Academic Research Infrastructure accounts. NSF, in FY 1995, supplied nearly two-thirds of all academic R&D plant. Facilities and equipment for instruction increased 7 percent to $53 million, with all of the increase attributable to the Department of Defense (DOD). General support for S&E nearly doubled to $265 million because of more complete reporting from the Agency for International Development (AID). General support for S&E includes activities that provide support for nonspecific or generalized purposes related to scientific research and education.

Chart 1. Federal obligations for academic science and engineering (S&E) and S&E research and development (R&D): FYs 1985–95



SOURCE: NSF/SRS, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: FY 1995

Agency Sources

Of the six Federal agencies that accounted for the largest amounts of academic S&E support in FY 1995 (collectively providing 94 percent of the total), four (HHS, NSF, USDA, and the National Aeronautics and Space Administration (NASA)) reported current-dollar increases (table 1). However, when adjusted for inflation, only NASA and NSF showed increases (9 percent and 6 percent, respectively, in constant 1992 dollars). Nearly three-fourths of the NASA increase was for R&D projects and more than three-fifths of the NSF increase was for R&D plant support.

University Shares

The leading 100 university S&E recipients in FY 1995 (out of 1,111 institutions, excluding 42 system offices) accounted for 81 percent of the total and 83 percent of academic R&D (each of the leading 100 is a doctorate-granting institution). In FY 1995, less than one-third of all academic institutions receiving Federal S&E obligations granted doctorates, but nearly all (96 percent) academic S&E support was obligated to these leading 100 doctorate-granting institutions. Clearly this is indicative of the preponderance of R&D obligations in Federal S&E support and the concentration of academic R&D activity in these institutions.

Table 1. Federal academic S&E obligations, by agency: FYs 1994–95

Agency	FY 1994	FY 1995	Current dollars	1992 dollars
	(Millions of dollars)		(Percent change)	
Total	$13,775	$14,346	4.1%	1.6%
HHS	6,890	7,036	2.1	-0.3
NSF	2,042	2,210	8.2	5.6
DOD	1,889	1,851	-2.0	-4.4
USDA	940	944	0.4	-2.0
NASA	740	824	11.3	8.6
DOE	636	635	-0.1	-2.5
All other agencies	638	846	32.6	29.4

SOURCE: NSF/SRS, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: FY 1995

Johns Hopkins University, including its Applied Physics Laboratory, was the leading university recipient of Federal S&E support in FY 1995 (table 2). Nearly four-fifths of its $729 million total was for R&D programs and most of the remainder was for "other S&E activities." The leading 20 universities, ranked by the amount of Federal academic S&E support they received, accounted for 36 percent of the academic S&E total. Eighteen of the top 20 academic S&E recipients in FY 1995 were among the leading 20 recipients in FY 1994. The new entrants for FY 1995 were the California Institute of Technology (twelfth) and the University of Pittsburgh (nineteenth). Cal Tech, previously ranked thirty-first, received about double its FY 1994 S&E obligation level, primarily as a result of increased NSF R&D and R&D plant support. Cal Tech received $90 million from NSF for R&D plant in FY 1995, resulting primarily from its $85 million Laser Interferometer Gravitational Wave Observatory project. The University of Pittsburgh was previously ranked twenty-third in academic S&E support. The five leading universities in FY 1994 maintained the same ordinal positions in FY 1995.

Geographic Distribution

Federal S&E support to academic institutions is concentrated among several states. In FY 1995, 14 states accounted for 68 percent of such support. In each of these states, institutions collectively received over $300 million in academic S&E obligations. These states were located along the Atlantic and Pacific coasts and within the East North Central Region (i.e. Great Lakes). Texas remained as the only $300 million-plus recipient outside of those regions. The six states receiving the largest amounts of Federal academic S&E obligations in FY 1994 maintained the same ordinal positions in FY 1995. Academic institutions within those 14 states also accounted for over two-thirds of all federally financed R&D expenditures at doctorate-granting institutions and enrolled nearly two-thirds of all graduate S&E students. The 14 leading states in terms of academic S&E obligations received in FY 1995 were also the top 14 states in FY 1994 (table 3).

Table 2. Federal academic science & engineering (S&E) support to the top 20 universities: FY 1995

Rank	Institution	Total academic S&E	R&D	R&D plant	Facilities & equipment for instruction	Fellowships, traineeships, & training grants	General support for S&E	Other S&E activities
		(Millions of dollars)						
	Total, all institutions	$14,346.0	$12,068.4	$335.2	$52.9	$673.7	$264.6	$951.3
1	Johns Hopkins Univ.1/	729.2	569.3	2.1	0.0	18.9	31.8	107.0
2	Univ. of Washington-Seattle	339.5	299.6	2.6	0.0	18.6	5.4	13.2
3	MA Inst of Technology	306.8	282.1	5.7	0.0	13.7	3.0	2.3
4	Stanford Univ.	298.1	266.7	2.8	0.3	18.4	1.1	8.9
5	Univ. of Michigan	268.1	243.1	1.7	--	15.3	2.4	5.6
6	Univ. CA San Diego	255.9	239.1	2.0	0.0	10.1	3.4	1.3
7	Univ. WI Madison	241.5	207.5	4.8	0.3	8.3	2.6	17.9
8	Cornell Univ.	240.7	202.1	11.7	0.3	10.1	0.7	15.8
9	Univ. of Minnesota	230.7	202.4	1.1	0.1	8.7	5.9	12.5
10	Univ. CA Los Angeles	229.7	216.4	0.4	0.1	10.0	0.5	2.3
11	Univ. of PA	220.0	197.2	5.6	0.0	14.1	0.1	3.0
12	California Inst of Tech	219.5	113.7	90.6	0.1	4.7	0.0	10.4
13	Harvard Univ.	219.2	191.5	0.2	0.4	20.4	5.3	1.4
14	Univ. CA San Francisco	215.4	201.8	0.0	0.0	13.1	--	0.5
15	Columbia Univ. City New York	200.2	186.2	2.6	0.0	9.9	0.1	1.4
16	Yale Univ.	195.7	179.5	2.9	0.0	11.8	0.5	0.9
17	Pennsylvania State Univ.	188.6	152.4	0.4	0.3	4.3	0.7	30.5
18	Univ. of Colorado	187.5	165.4	1.3	0.1	10.3	8.0	2.4
19	Univ. of Pittsburgh	182.4	171.3	--	--	6.1	0.3	4.7
20	Univ. CA Berkeley	181.3	142.3	3.9	0.1	11.1	0.5	23.3
	Total, top 20 institutions	5,150.1	4,429.7	142.3	2.2	238.2	72.4	265.3

1/ Includes funding for the Applied Physics Laboratory

KEY: "--" = Less than $50,000

SOURCE: NSF/SRS, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: FY 1995

Table 3. Federal academic science and engineering support to states receiving at least $300 million: FY 1995

State	S&E support	Share of total S&E
	(Millions of dollars)	(Percent)
Total S&E	$14,346.0	100.0%
California	1,952.7	13.6
New York	1,126.7	7.9
Maryland	934.3	6.5
Massachusetts	900.1	6.3
Pennsylvania	832.1	5.8
Texas	759.5	5.3
North Carolina	539.1	3.8
Illinois	523.1	3.6
Michigan	454.4	3.2
Washington	400.3	2.8
Ohio	399.8	2.8
Georgia	338.0	2.4
Wisconsin	308.4	2.1
Florida	300.6	2.1
All other states	4,576.9	31.9

SOURCE: NSF/SRS, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: FY 1995

HISTORICALLY BLACK COLLEGES AND UNIVERSITIES (HBCUS)

Federal S&E obligations for 84 HBCUs increased by 17 percent (following a 21–percent increase the year before) and totaled $328 million in FY 1995. R&D programs accounted for 62 percent of all HBCU funding, smaller than the 84-percent share among all universities and colleges. More than one-half of the HBCU funding increase was for R&D projects. The miscellaneous category, "other S&E activities," continued to account for the second largest portion of S&E support at both HBCUs (16 percent) and among all academic institutions (7 percent). Howard University, with $35 million in total S&E support and $31 million in R&D funding, was the top HBCU recipient in terms of both total S&E and R&D support. Of the 84 HBCUs obligated S&E funds in FY 1995, 56 of them showed current-dollar increases from the FY 1994 level. The leading 20 HBCU recipients in FY 1995 accounted for 76 percent of all HBCU S&E

support. The USDA, HHS, and NASA combined obligated over three-fifths of all academic S&E dollars to HBCUs in FY 1995.

Independent Nonprofit Institutions

Federal agencies' obligations in FY 1995 for S&E R&D and R&D plant to 1,177 independent nonprofit institutions (excluding obligations to Federally Funded Research and Development Centers administered by nonprofit institutions) totaled $3.3 billion, a 6-percent current-dollar increase. This increase follows two successive years of current-dollar reductions. Research institutes, numbering less than one-fourth of all nonprofit organization recipients (which also include voluntary hospitals and other independent institutions such as private foundations and trade associations), received 57 percent of all nonprofit funds. The number of research institutes proportionally has decreased over time, but their proportional share of nonprofit funding continues to be strong. In FY 1985, 10 years earlier, research institutes accounted for 42 percent of all nonprofit recipients and received 69 percent of all nonprofit obligations. Five of the top 10 nonprofit Federal R&D recipients in FY 1995, including the top three nonprofits (Draper Laboratories, the Mitre Corporation, and the Battelle Memorial Institute) were research institutes (table 4). The three largest voluntary hospital recipients (Massachusetts General Hospital, Brigham and Women's Hospital, and the Scripps Clinic & Research Foundation) were among the top 10 nonprofit institutions for the seventh consecutive year. Eight of the top 10 nonprofits were among the leading 10 in FY 1994, with the new entrants being the Fred Hutchinson Cancer Research Center and the Association of Universities for Research and Astronomy. The leading 10 nonprofits accounted for 38 percent of all Federal S&E R&D and R&D plant funds to nonprofit institutions in FY 1995.

HHS provided 43 percent of Federal R&D and R&D plant funding to nonprofit institutions in FY 1995, and nearly all such Federal support (96 percent) to voluntary hospitals. DOD supplied 31 percent of all Federal R&D and R&D plant nonprofit support; 85 percent of these DOD funds were obligated to research institutes.

Table 4. Federal R&D and R&D plant obligations to the leading 10 independent nonprofit institutions, ranked by total amount received in FY 1995

Institution and ranking	Total	DOD	DOE	HHS	NASA	NSF	Other
	(Millions of dollars)						
Total, all nonprofit institutions	$3,309.5	$1,020.2	$178.5	$1,432.2	$209.0	$175.9	$293.6
1. Draper Laboratories	264.2	260.1	0.0	0.0	4.0	0.1	0.0
2. Mitre Corporation	188.9	183.4	1.7	0.3	3.1	0.1	0.3
3. Battelle Memorial Inst	178.1	63.8	98.6	10.4	2.3	0.2	2.9
4. MA General Hospital	111.0	5.6	0.9	103.6	0.0	0.7	0.2
5. Brigham and Women's Hosp	103.4	0.6	0.0	101.7	0.6	0.1	0.5
6. F. Hutchinson Cancer Rsch	95.1	0.0	0.1	94.4	0.1	0.1	0.4
7. Natl Academy of Sciences	93.0	18.9	19.4	5.1	22.1	10.7	16.8
8. Sematech, Inc	87.9	87.9	0.0	0.0	0.0	0.0	0.0
9. Scripps Clinic & Rsch Fdn	83.2	1.1	0.1	82.0	0.0	0.0	0.0
10. Assc. U. Rsch & Astronomy	61.3	0.1	0.0	0.0	61.2	0.0	0.0

KEY: "--" = Less than $50,000

SOURCE: NSF/SRS, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions: FY 1995

General Notes

The data presented in these tables represent all categories of direct Federal science and engineering (S&E) support to institutions of higher education in the United States. The 15 Federal agencies included provided virtually all funding for S&E research and development (R&D) at universities and colleges. In addition, data are reported on these agencies' obligations to nonprofit institutions. Data on field of S&E disciplines, on type of institutional control, and on highest degree granted were not published in this report but are available upon request.

Data Limitations and Relationship of This Survey to the Survey of Federal Funds for Research and Development

Data presented in this report on R&D and R&D plant by agency sometimes conflict significantly with such data presented in the annual National Science Foundation (NSF) survey titled Federal Funds for Research and Development, referred to hereafter as the Federal funds survey. The treatment of interagency transfers explains much of the difference in the totals. Interagency transfers of funds obligated to an academic or nonprofit institution are reported in the Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions (Federal S&E support survey) by the agency that actually obligates the funds to the receiving institution. In the Federal funds survey, however, obligations are reported by the initiating agency.

Each of several agencies utilizes personnel from separate internal offices to respond to the two individual surveys, and each frequently collects data from different sources. Data for the Federal S&E support survey, for example, are generally processed from award files; whereas Federal funds survey data are usually derived from agency budget documents.

Respondents from the separate internal offices that participate in the two surveys also frequently differ in their interpretation of the survey questions. The National Institutes of Health, for example, report Biomedical Research Support Grants under "general support for science and engineering" in the Federal S&E support survey but under "research and development" in the Federal funds survey. Regarding the structure of the surveys themselves, the data presented in this report differ in two main ways from those presented in the report on the Federal funds survey, as follows.

1. The two surveys differ in number of agencies involved. In the Federal S&E support survey, the 15 Federal agencies that obligate virtually all of Federal support to academic R&D collect data on all Federal S&E obligations to institutions of higher education. For the Federal funds survey, data are gathered on budgets for R&D and R&D plant from all 33 Federal agencies that conduct such programs.

2. The scope of information gathered differs. Data collected in the Federal S&E support survey pertain to individual academic institutions. Those collected in the Federal funds survey relate to all types of performers and are detailed as to character of work (basic research, applied research, and development).

The fiscal year (FY) 1995 data shown in this report were submitted by the following Federal agencies, listed by the acronyms or abbreviated forms under which data were reported for them:

AID - Agency for International Development
Com - Department of Commerce
DoD - Department of Defense
DOT - Department of Transportation
ED - Department of Education
EPA - Environmental Protection Agency
DOE - Department of Energy
HHS - Department of Health and Human Services

ACF - Administration for Children and Families
AHCPR - Agency for Health Care Policy and Research
AoA - Administration on Aging
ATSDR - Agency for Toxic Substances and Disease Registry
CDC - Centers for Disease Control and Prevention

FDA	-	Food and Drug Administration
HCFA	-	Health Care Financing Administration
HRSA	-	Health Resources and Services Administration
IHS	-	Indian Health Service
OASH	-	Office of the Assistant Secretary for Health
NIH	-	National Institutes of Health
SAMHSA	-	Substance Abuse and Mental Health Services Administration
SSA	-	Social Security Administration
HUD	-	Department of Housing and Urban Development
Int	-	Department of the Interior
Labor	-	Department of Labor
NASA	-	National Aeronautics and Space Administration
NRC	-	Nuclear Regulatory Commission
NSF	-	National Science Foundation
USDA	-	Department of Agriculture

The following abbreviated references are used:

FFRDC	-	federally funded research and development center
FTTG	-	fellowships, traineeships, and training grants
FY	-	fiscal year
n.e.c.	-	not elsewhere classified
R&D	-	research and development
S&E	-	science and engineering
SRS	-	Division of Science Resources Studies, NSF, which produces this report

Obligations shown for universities and colleges do not include funds obligated to FFRDCs administered by academic institutions. FFRDCs are R&D-performing entities that are formed to meet a particular Federal R&D objective that cannot be met effectively by existing organizational resources. They range from the traditional contractor-owned/contractor-operated or Government-owned/contractor-operated organizational structures to various degrees of contractor/Government control and ownership.

The data exclude financial support of an indirect nature, such as funds allocated to state agencies, even if the final recipient of such funds is known to be an academic institution.

Because of rounding, data shown in the text or tabulations may not add to the totals or subtotals. Reported obligations were rounded to the nearest thousand dollars.

For further information concerning the availability of Federal S&E support survey data and the technical aspects of this survey, please contact—

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Information Sources

Data Tapes

Public-use tapes from the Integrated Academic Science and Engineering Data Base are available for purchase and will normally be shipped within 3 working days from order receipt. Data tapes from the most recent survey (1995) are currently available. Individuals interested in obtaining data tapes from the NSF Surveys of Academic Science and Engineering should contact NSF's Division of Science Resources Studies at (703) 306-1772.

Institutional Profiles

Selected data items are available on computer-generated institutional profiles for individual doctorate-granting institutions and schools with science and engineering departments that grant a master's degree. An institutional profile consists of data not only from this survey, but from NSF's other two academic S&E surveys: the Survey of Scientific and Engineering Expenditures at Universities and Colleges (R&D expenditures survey) and the Survey of Graduate Students and Postdoctorates in Science and Engineering (graduate student survey).

CASPAR

Users are now able to acquire data from several academic S&E resources on CD-ROM or over the Internet. The compact disk contains the Computer-Aided Science Policy Analysis and Research (CASPAR) database system, which is an easy-to-use tool for retrieval and analysis of statistical data on academic S&E resources. For information on downloading CASPAR using a Web browser or anonymous FTP, connect to: http://www.qrc.com/nsf/srs/caspar/start.htm.

CASPAR provides the analyst with an extensive and growing data library with multiyear statistics on the state of higher education in general and on academic S&E resources specifically. This data library is developed from multiple sources using standardized institutional names and field of S&E definitions. The CASPAR program includes built-in help capabilities to facilitate the use and interpretation of the data.

CASPAR data are drawn from a number of sources. All data are available at the individual institution level, at the state level, and at the national level. Longitudinal data from surveys of universities and colleges conducted by the NSF's Division of Science Resources Studies include the Federal S&E support survey, R&D expenditures survey, and the graduate student survey. Data from the surveys of universities and colleges conducted by the National Center for Education Statistics include earned degrees, opening fall enrollment, faculty salaries, tenure and fringe benefits, and financial statistics. Data from other sources include the National Research Council Doctorate Programs Ratings.

For additional information on CASPAR, write or fax your request to the following address:

Quantum Research Corp.
ATTN: CASPAR
7315 Wisconsin Avenue, Suite 400W
Bethesda, MD 20814

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Section A.

Technical Notes

SCOPE OF SURVEY

Data presented in this report are collected annually through the National Science Foundation's (NSF) Survey of Federal Science and Engineering (S&E) Support to Universities, Colleges, and Nonprofit Institutions (Federal S&E support survey). The survey originated in 1965, when the Committee on Academic Science and Engineering (CASE) within the Federal Council for Science and Technology established the CASE data collection system in order to report annually on Federal S&E obligations to academic institutions and associated federally funded research and development centers (FFRDCs). Since 1968, CASE data, as well as data on nonprofit institutions, have also served as the basis for an annual report to the President and Congress.

This survey is designed to collect information from Federal agencies on (1) total S&E program support in thousands of dollars to academic institutions, (2) total S&E support to FFRDCs administered by academic institutions, and (3) research and development (R&D) and R&D plant support to nonprofit institutions and associated FFRDCs.

Data are shown for Federal S&E obligations to institutions classified as historically black universities and colleges by type of activity, by agency, and by R&D obligations.

The fiscal year (FY) 1995 data in this report were submitted by 15 Federal agencies, covering the period October 1, 1994, through September 30, 1995. Data reported by the Agency for International Development, the Departments of Housing and Urban Development, Labor, and Transportation, and the Nuclear Regulatory Commission were combined, because of space constraints, to constitute the "other" category in tables that show funding by agency. In 1995, these five agencies accounted for less than 2 percent of all Federal S&E academic support. In most tables that list data by agency and by individual institution, the "other" column includes data from the Department of the Interior in addition to the above five agencies. In 1995, the 15 agencies reported obligations to 1,111 universities and colleges, 42 academic system offices, and 1,177 independent nonprofit institutions.

In FY 1995, the Johns Hopkins University Applied Physics Lab (APL) accounted for practically all of Johns Hopkins' $395 million in total funding from the Department of Defense (DoD). Although the precise figures are unknown, perhaps as much as $380 million of the $395 million reported by DOD to Johns Hopkins were obligated for S&E activities at APL. During the FY 1987 survey cycle, DoD determined that some funds reported in prior years as R&D obligations to APL were more appropriately classified as "other sciences and engineering." Data for FYs 1984–86 were revised, but DoD was unable to revise data prior to FY 1984.

To better differentiate between that part of the Federal R&D budget that supports "science and key enabling technologies" (including for military and nondefense applications) and that which primarily concerns "testing and evaluation of large technical systems prior to production" (of mostly defense-related systems), NSF now collects from DoD development dollars in two categories, advanced technology development and major systems development.

As a result of trend editing of the Department of Education's (ED's) data each year, a small number of academic institutions' dollar totals are distributed by type of activity (R&D, R&D plant, etc.) on a prorated basis through FY 1992 by NSF because ED could evaluate the data only on a "total obligations" basis. During the FY 1987 survey cycle, ED determined that institution coding problems in earlier years caused its database to produce several large funding trend shifts at specific universities.

ED has made major software modifications to the automated system from which the Federal S&E data were produced. Therefore, due to a revamped coding structure, there are trend differences among institutions' data from ED beginning in FY 1993. Those trend differences were a major factor in NSF's decision not to publish "non-S&E" totals beginning for the FY 1993 report. ED accounted for 91 percent ($5.9 billion) of the total Federal support for "non-S&E" ($6.5 billion) for FY 1993. To explain ED's downward academic R&D trend between FY 1993 and FY 1994 (from $95 million to $49 million), that agency stated that academic R&D programs in FY 1994 either were not funded, did not have a science and engineering component, or received reductions in funding.

"R&D plant" in this report refers to large facilities and fixed equipment. Data on "research instrumentation" are not separately identifiable in this report. Research instrumentation funds are for equipment purchased under research project awards from current-fund accounts and are included under totals for research and development.

Some agencies not surveyed, such as the Department of Justice, may account for a significant proportion of the total receipts at some institutions, even though those receipts may constitute a small proportion of total academic R&D.

Obligations listed for individual institutions reflect direct Federal S&E support so that amounts subcontracted to other institutions are included. Those funds received through subcontract arrangements from prime contractors are excluded.

Federal obligations to institutions are presented on the basis of the individual institutions that are components of the system, but obligations awarded directly to the central administration of a system are listed separately. If the final destination of the funds is not known, however, the agencies report them as obligations to a system's administrative office, or "central system," from which the funds are distributed to the system's individual institutions.

Other Science Resources Studies Reports on Federal R&D Funding

In addition to the Survey of Federal Funds for Research and Development report, the NSF's Division of Science Resources Studies publishes one other report related to Federal R&D funding. *National Patterns of R&D Resources* includes information on R&D expenditures by different performers including industry, academia, and the Federal Government. The expenditures data in *National Patterns,* with the exception of Federal intramural R&D, are based on sample surveys of the performers of R&D. Respondents are asked to report how much they actually spent on R&D during the year and the source of those funds. Data in *National Patterns* are based on expenditures reported by performers; performers of R&D often expend Federal funds in a different year from the one in which the Federal Government provided authorization, obligations, or outlays.

Definitions

Obligations are the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated and when future payment of money is required. Obligations differ from expenditures in that funds allocated by Federal agencies during one fiscal year may be spent by the recipient institution either partially or entirely during one or more subsequent years.

Type of Institution

Universities and colleges are those institutions of higher education in the United States that offer at least one year of college-level study leading toward a degree. A university or college comprises all parts of an academic institution, such as colleges of liberal arts, professional schools, hospitals, schools of agriculture, and agricultural experiment stations, including bureaus, offices, and research centers (excluding FFRDCs), whether located on or off the main campus, and branch campuses controlled directly by the parent institution. The universe of academic institutions that is the foundation of this survey is derived from the higher education institutions' portion of the Department of Education's Integrated Postsecondary Education Data System (IPEDS), sponsored by the National Center for Education Statistics, and the *1996 Higher Education Directory,* published by Higher Education Publications, Inc.

Institutions included are those that received Federal S&E support during FY 1995 and possessed a significant degree of academic and administrative autonomy. Institutions within a system (a group of institutions having a collective legal status and generally recognized by a state government, a board of education, or other relevant organization) in which a significant degree of autonomy remains at the individual institution level are presented separately; obligations to branch campuses are included in the totals for their parent institutions. The study excludes all obligations to the service academies and to the U.S. Department of Agriculture Graduate School.

Independent nonprofit institutions are legal entities other than universities and colleges, are privately organized or chartered to serve the public interest, and are exempt from most forms of Federal taxation. Data presented for nonprofit institutions and for

nonprofit-administered FFRDCs are obligations for R&D and R&D plant reported by the 15 participating agencies.

Coverage of the nonprofit section in the Federal support survey was expanded beginning in the late 1970s to include all types of nonprofit institutions that receive Federal R&D funds. For NSF purposes the types of institutions are defined as follows:[1]

1. **Research institute.** A separately incorporated, independent nonprofit organization operating under the direction of its own controlling body, the primary function of which is the performance of R&D in the sciences and engineering.

2. **Voluntary hospital.** A member of the American Hospital Association not subject to the control of either Federal, state, or local governments, nor an integral part of any institution of higher education. Hospitals that have been set up by research institutes and that, although providing patient care, function primarily as laboratories for the research institutes are included in the "Research institute" category.

3. **All other independent nonprofit institutions.**

   (a) **Professional or technical society, or academy of science and engineering.** A voluntary association of individuals sharing a common interest in the advancement of knowledge, either within a single field or across a broad spectrum of disciplines. The major function of these organizations is to aid and encourage the collection, collation, and dissemination of S&E knowledge for the benefit of their members and the community as a whole.

   (b) **Private foundation.** A nongovernmental, nonprofit organization having a principal fund of its own, managed by its own trustees or directors, and established to maintain or to aid social, educational, charitable, religious, or other activities serving the common welfare. Private foundations include operating foundations that allocate the greater proportion of their R&D budgets to intramural performance and philanthropic foundations that allocate most of their funds to grants and contracts for research to be performed extramurally.

   (c) **Science exhibitor.** A nonprofit organization whose primary goal is to expand scientific literacy within the community by providing exhibits that display and interpret the latest scientific findings within its field or fields. Included in this category are museums, zoological parks, botanical gardens, and arboretums.

   (d) **Trade association.** An organization of business competitors, in a specific industry or business, that is interested primarily in the commercial promotion of products or services. Membership is usually held in the name of a business entity. Activities may fall into one or more of the following areas: business ethics, management practices, standardization, commercial (i.e., statistical) research, publication, promotion, and public relations.

   (e) **Agricultural cooperative.** An organization of individuals or business entities that are normally competitors in the production and sale of agricultural products. Activities may include one or more of the following areas: collective marketing or purchasing, research, public relations, and the improvement of the economic condition of the farm population of the United States.

Category of Support

Academic science and engineering includes all obligations for R&D; R&D plant; facilities and equipment for S&E instruction; fellowships, traineeships, and training grants (FTTGs); general support for science and engineering; and other S&E activities. These activities are defined as follows:

1. **Research and development** includes all research activities, both basic and applied, and all development activities that are supported at universities and colleges. Demonstration projects conducted to discover whether a technology or method is workable are considered to be within the scope of R&D if their

[1] National Science Foundation, *R&D Activities of Independent Nonprofit Institutions, 1973* (NSF 75-308) (Washington, DC: GPO, 1975).

objective is to produce new information within a specific time period.

"Research" is defined as systematic study directed toward fuller scientific knowledge or understanding of the subject studied. Research can be classified as basic or applied, although data reported here are not separated into these categories. In basic research the investigation is oriented toward gaining a better knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications toward processes or products in mind. In applied research the investigation is aimed at gaining the knowledge or understanding necessary for determining the means by which a recognized and specific need may be met.

"Development" is the systematic use of knowledge and understanding gained from research directed toward the production of useful materials, devices, systems, or methods, including design and development of prototypes and processes.

Research and development excludes topographic mapping and surveys, collection of general-purpose statistics, and activities concerned primarily with the dissemination of scientific information. Also excluded are routine product testing, quality control, and R&D facilities and fixed equipment.

"Research equipment" is included as part of R&D. It includes any item (or interrelated collection of items constituting a system) of nonexpendable tangible property or software having a useful life of more than 2 years and an acquisition cost of $500 or more that is used wholly or in part for research.

2. **R&D plant** includes all costs—direct, indirect, and related—of all projects whose main objective is to provide support for the construction, acquisition, renovation, modification, repair, or rental of facilities, land, works, or equipment for use in scientific or engineering research and development. A facility is interpreted broadly to be any physical resource important to the conduct of R&D. Excluded are expendable research equipment and office furniture and equipment.

3. **Facilities and equipment** for S&E instruction include all programs whose main purpose is to provide support for the construction, acquisition, renovation, modification, repair, or rental of facilities, land, works, or equipment for use in instruction in science and engineering.

4. **Fellowships, traineeships, and training grants** include graduate programs in support of the development and maintenance of S&E personnel resources. The total amounts pertaining to such awards (stipends and cost-of-education allowances) are reported on the basis of the institution chosen by the recipient. Excluded are programs that support research and education institutes, seminars, and conferences such as teacher-training activities provided through teacher institutes, short courses, research participation, and in-service seminars; activities aimed at the development of education techniques and materials for use in S&E training; and programs that provide special opportunities for increasing the scientific knowledge and experience of precollege and undergraduate students. These activities are included in "other science and engineering activities" (see category 6) if they are S&E oriented.

5. **General support for science and engineering** includes programs that support nonspecific or generalized purposes related to scientific research and education. Such projects are generally oriented toward academic departments, institutes, or institutions as a whole and embody varying types of support—ranging from support provided without any specification of purpose other than that the funds be used for scientific projects to projects in which funds are provided for activities within a specified field of science and engineering without a specific purpose. The National Institutes of Health's (NIH's) Biomedical Research Support Grants and Minority Biomedical Support Grants are examples of these types of programs.

6. **Other S&E activities** include all academic S&E activities that cannot be assigned to one of the preceding five categories, including obligations in support of technical conferences, teacher institutes, and activities aimed at increasing the scientific knowledge of precollege and undergraduate students.

Federally Funded Research and Development Centers

The following is a list of federally funded research and development centers (FFRDCs) included in the Federal S&E support survey. The list is arranged by sponsoring agency and administering organization (in parentheses). Respondents reported under the FFRDC category funds that were obligated to the centers identified on this list.

Department of Defense

Office of the Secretary of Defense

Administered by other nonprofit institutions[1]

Institute for Defense Analyses Studies and Analyses FFRDC (Institute for Defense Analyses), Alexandria, VA

Logistics Management Institute (Logistics Management Institute), McLean, VA[2]

National Defense Research Institute (RAND Corp.[3]), Santa Monica, CA

C3I Federally Funded Research and Development Center (MITRE Corp.[4]), Bedford, MA, and McLean, VA

Defense Advanced Research Projects Agency

Administered by universities and colleges[5]

Software Engineering Institute (Carnegie Mellon University), Pittsburgh, PA

National Security Agency

Administered by other nonprofit institutions[1]

Institute for Defense Analyses Communications and Computing Federally Funded Research and Development Center[6] (Institute for Defense Analyses), Alexandria, VA

Department of the Navy

Administered by other nonprofit institutions[1]

Center for Naval Analyses, (The CNA Corp.), Alexandria, VA

Department of the Air Force

Administered by universities and colleges[5]

Lincoln Laboratory (Massachusetts Institute of Technology), Lexington, MA

Administered by other nonprofit institutions[1]

Aerospace Federally Funded Research and Development Center (The Aerospace Corp.), El Segundo, CA

Project Air Force (RAND Corp.[3]), Santa Monica, CA

Department of the Army

Administered by other nonprofit institutions[1]

Arroyo Center (RAND Corp.[3]), Santa Monica, CA

Department of Energy

Administered by universities and colleges[5]

Ames Laboratory (Iowa State University of Science and Technology), Ames, IA

Argonne National Laboratory (University of Chicago), Argonne, IL

Brookhaven National Laboratory (Associated Universities, Inc.), Upton, Long Island, NY

Ernest Orlando Lawrence Berkeley National Laboratory (University of California), Berkeley, CA

Fermi National Accelerator Laboratory (Universities Research Association, Inc.), Batavia, IL

Lawrence Livermore National Laboratory (University of California), Livermore, CA

Los Alamos National Laboratory (University of California), Los Alamos, NM

Oak Ridge Institute for Science and Education (Oak Ridge Associated Universities, Inc.), Oak Ridge, TN

Princeton Plasma Physics Laboratory (Princeton University), Princeton, NJ

Stanford Linear Accelerator Center (Leland Stanford Junior University), Stanford, CA

Thomas Jefferson National Accelerator Facility[7] (Southeastern Universities Research Association, Inc.), Newport News, VA

Administered by other nonprofit institutions[1]
National Renewable Energy Laboratory[8] (Midwest Research Institute), Golden, CO

Pacific Northwest National Laboratory (Battelle Memorial Institute), Richland, WA

National Aeronautics and Space Administration

Administered by universities and colleges[5]
Jet Propulsion Laboratory (California Institute of Technology), Pasadena, CA

National Science Foundation

Administered by universities and colleges[5]
National Astronomy and Ionosphere Center (Cornell University), Arecibo, PR

National Center for Atmospheric Research (University Corp. for Atmospheric Research), Boulder, CO

National Optical Astronomy Observatories[9] (Association of Universities for Research in Astronomy, Inc.), Tucson, AZ

National Radio Astronomy Observatory (Associated Universities, Inc.), Green Bank, WV

Administered by other nonprofit institutions[1]
Critical Technologies Institute (RAND Corp.[3]), Washington, DC

Nuclear Regulatory Commission

Administered by other nonprofit institutions[1]
Center for Nuclear Waste Regulatory Analyses (Southwest Research Institute), San Antonio, TX

Department of Transportation

Federal Aviation Administration

Administered by other nonprofit institutions[1]
Center for Advanced Aviation System Development (MITRE Corp.[4]), McLean, VA

Department of the Treasury

Internal Revenue Service

Administered by other nonprofit institutions[1]
Tax Systems Modernization Institute (IIT Research Institute), Lanham, MD

Endnotes

[1] That is, other than universities and colleges.
[2] Logistics Management Institute (LMI) moved from Bethesda, MD, to McLean, VA, in May 1994.
[3] The following portions of the RAND Corp. are FFRDCs: Project Air Force, National Defense Research Institute (formerly Defense/Office of the Joint Chiefs of Staff), the Arroyo Center, and the Critical Technologies Institute. All other agency support to RAND is reported under nonprofit institutions.
[4] Only the C3I Federally Funded Research and Development Center and the Center for Advanced Aviation System Development parts of the MITRE Corp. are FFRDCs. All other agency support to MITRE is reported under nonprofit institutions.
[5] Includes university consortia.
[6] Although the Institute for Defense Analyses Communications and Computing FFRDC has been in existence since 1956, the Department of Defense added it to the Master Government List of FFRDCs for the first time in October 1995.
[7] In May 1996 the name was changed from Continuous Electron Beam Accelerator Facility.
[8] In September 1991 the name was changed from Solar Energy Research Institute.
[9] Since February 1984 this center has included three former FFRDCs: Cerro Tololo Inter-American Observatory, Kitt Peak National Observatory, and the National Solar Observatory (formerly Sacramento Peak Observatory).

NOTES: The Department of the Army decertified the Institute for Advanced Technology (University of Texas), Austin, TX, as an FFRDC in November 1993. All obligations previously reported to this institution should be reported under universities and colleges.

The Department of Energy removed the Inhalation Toxicology Research Institute from the Master Government List of FFRDCs in May 1996.